REMARKS

Pages 4 and 5 have been replaced to correct for the following informalities: (1) remove highlighting; and (2) replace attorney docket number "SEA 2758" with the patent number.

Claims 1, 3, 6 and 9-16 were rejected as being obvious over Bian in view of Okumura, Lal and "applicants' admissions" as "evidenced by Wang." Claims 4, 7, 8, 17 and 19 were rejected as being obvious over Bian in view of Lal, Okumura and "applicant's admissions" as applied above, and further in view of Chen ('795) or Chen ('923). Claims 5 and 18 were rejected as being obvious over Bian in view of Lal, Okumura and "applicant's admissions" as applied above, and further in view of Chen ('795) or Chen ('923) as applied above, and further in view of Abarra. These rejections are respectfully traversed.

From the plain reading of the Examiner's obviousness rejection of claims 1, 3, 6 and 9-16, it is clear that the Examiner has made the obviousness rejection "over Bian et al. ('742 A1) in view of Lal et al. ('942), Okumura et al. ('733) and applicants' admissions" and has applied Wang to show that "applicants' admissions" are "evidenced by Wang." (See paragraph 4 of the Action). The Applicants have argued in the previous response of June 26, 2003, that Applicants' own explanation on page 6, lines 3-16, of the specification can not be applied against the Applicants' own invention just because the explanation falls under the section "Background." For example, in a similar situation, the Federal Circuit in *In re Soni*, 54 F.3d 746, 34 USPQ2d 1684 (Fed. Cir. 1995) clarified that the USPTO erred in construing a statement in the applicant's specification as an admission that a claimed composition's improved properties would have been expected. The Examiner has attempted to show that the explanation on page 6, lines 3-16, of the specification would have been known to persons of ordinary skill as "evidenced by Wang." However, Wang was not published at the time of filing of this application. Thus, Wang would have provided no evidence to persons of ordinary skill in this art at the time of the claimed invention because it was published *after* the filing date of the pending application. The Federal Circuit in *Stewart Warner Corp. v. City of Pontiac*, 767 F.2d 1563, 226 USPQ 676 (Fed. Cir. 1985) held that developments *after* the date of invention should not be considered in determining

the level of skill in the art and obviousness. In short, the Examiner has improperly combined the cited references to establish a *prima facie* case of obviousness "over Bian et al. ('742 A1) in view of Lal et al. ('942), Okumura et al. ('733) and applicants' admissions."[1]

Obviousness is a question of law based on the underlying facts. The Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), stated that although "the ultimate question of patent validity is one of law ... the § 103 condition ... lends itself to several basic factual inquiries." The Supreme Court in *Graham* explicitly stated that the factual inquiries are:

> [1] the scope and content of the prior art are to be determined; [2] differences between the prior art and the claims at issue are to be ascertained; [3] and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. *Id.*

The Federal Circuit has emphasized the need for express findings of the *Graham* factual inquiries in an ordered and systematic manner. See *Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 990 (Fed. Cir. 1988). The Applicants respectfully submit that the Examiner has failed to make *express and correct* findings of the *Graham* factual inquiries in an ordered and systematic manner.

One would recognize that if the answers to the *Graham* factual inquiries are incorrect, as has been the case in the pending application, then the answer to the ultimate question of obviousness would also be incorrect because *obviousness is a question of law based on underlying facts.* The Applicants respectfully submit that the following *Graham* factual inquiries have not been decided in an ordered and systematic manner, which has thereby resulted in an incorrect conclusion by the Examiner that the pending claims are obvious over the cited references.[2]

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[1] If the Examiner intended to apply Wang as a 102(e) prior art, then the Examiner should have explicitly stated that the obviousness rejection was made in view of Wang, not as "evidenced by Wang." If Wang was applied as a 102(e) prior art, the Applicants could then have had the option to antedate Wang.

[2] The Applicants believe that once the Examiner will make the *Graham* factual inquiries in an ordered and systematic manner as has been done in the Amendment, the Examiner should

(1) Whether Bian's media has OR-Mrt of 1 or greater than 1?

The Examiner acknowledged in the Action of March 26, 2003, (continues to maintain this position) that Bian fails to disclose that "the non-magnetic substrate is mechanically textured and OR-Mrt is more than about 1.05." In the Amendment of June 26, 2003, the Applicants wrote:

> The Examiner seems to have recognized, but has not explicitly stated, that Bian discloses an isotropic media, *not* an oriented media. Thus, Bian's media has an OR-Mrt value of 1.0, *not* more than 1.0, in particular, not more than about 1.05 as recited in claims 1 and 11.

In response the Examiner writes in paragraph 7 of the Action:

> [A]pplicant(s) argue(s) that "the Examiner seems to have recognized, but has not explicitly stated, that Bian discloses an isotropic media, *not* an oriented media." The examiner respectfully disagrees.

The Examiner admits, and the Applicants agree, that "Bian et al. fail to disclose the non-magnetic substrate being textured, nor an OR-Mrt of more than about 1.05" as stated on page 3, second paragraph, of the Action. The unresolved factual inquiry is whether Bian's media could still have an OR-Mrt > 1.0, which is a requirement for an oriented medium.

To address this issue, first refer to the data in Table 1 of Okumura's ('733) demonstrates that all media on the substrates *without* mechanical texture have OR-Hc of 1, which means that all substrates without mechanical texture have an OR-Mrt of 1, not OR-Mrt > 1.0. Second, this application also states, "The Mrt orientation ratio of more than 1.05 is caused by the *combination* of circumferential mechanical texturing/grooving of the substrate and the Co(11.0) crystallographic orientation." [Page 6, lines 13-15 of the specification; emphasis added]. Third, L. Huang et al., in "Effects of plasma etching on orientation ratio for longitudinal recording media", Journal of Applied Physics, Vol. 91, No. 10, Page 8628, 15 May 2002, states in last 5 lines, first paragraph, that "Mirzamaani et al.[17] have also reported that (11.0) crystallographic

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arrive at the conclusion that the cited prior art references would not render the claimed invention obvious.

preferred orientation in the magnetic layer, in combination with substrate texture lines, was necessary to obtain OR>1. Our results are consistent with their observations."[3] Thus, one requirement for OR-Mrt > 1.0 appears to be that the media should be textured.

In short, Bian ***neither*** explicitly discloses that its media has an OR-Mrt > 1.0 ***nor*** would persons of ordinary skill in this art have concluded this. In short, the Examiner has correctly concluded that Bian fails to disclose on OR-Mrt of more than about 1.05.

(2) Is Bian's media ***oriented*** in-plane media?

Bian does not disclose an oriented media, yet the Examiner thinks it does. The Applicants respectfully submit that the Examiner has misunderstood the meaning of "in-plane crystallographic orientation" to mean "oriented in-plane media," and thus has incorrectly concluded that Bian's medium is ***oriented*** in-plane media as stated in the last paragraph of page 9 of the Action. The following points demonstrate that the Examiner's factual inquiry on this issue is faulty and that Bian's media is ***not*** *oriented* in-plane media:

(a) As explained above, the Examiner has acknowledged that the OR-Mrt of Bian's media is ***not*** more than about 1.05 as recited in claim 1. The specification clearly states, "Oriented media are the media with OR-Mrt more than 1, e.g. more than 1.05." See page 6, lines 15-16, of the specification. Clearly, if Bian's media does ***not*** have an OR-Mrt of more than about 1.05 as acknowledged by the Examiner, then in accordance with the definition of "oriented media" in the specification, Bian's media is ***not*** "oriented media." As is well-known, the Applicants can be their own lexicographers. Thus, the Examiner ***cannot*** interpret "an oriented medium" in the claims other than as a medium "with OR-Mrt more than 1, e.g. more than 1.05." The Examiner has acknowledged that Bian's media does not have an OR-Mrt of more than about 1.05, which is required for oriented media, so there is only one logical conclusion—Bian's media is ***not*** oriented media.

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[3] The "Huang et al." reference is attached herewith. The "Mirzamaani et al." reference refers to M. Mirzamaani et al., J. Appl. Phys. **67**, 4695-4697, (1990) and is also attached herewith.

(b) Persons of ordinary skill in this art would have recognized that the term "in-plane crystallographic orientation" is used in contrast with the out-plane orientation. Longitudinal media require Co-alloy C-axis parallel to film planes (in-plane). Perpendicular media require Co-alloy C-axis perpendicular to film planes. See attached Figure 1. The in-plane orientation is not related to the directional difference of properties along circumferential and radial directions. The distinction between isotropic vs. oriented media is based on the properties along the circumferential and radial directions *in* the disc plane. See attached Figures 2 and 3. This distinction is *not* based on whether the C-axis is oriented in-plane as in longitudinal recording media or out-of-plane as in perpendicular recording media. In fact, Bian itself clearly confirm this point. See col. 2, lines 5-10; and col. 2, lines 28-36, of Bian et al., US Patent 6143388. The present patent application also makes it clear that the in-plane c-axis crystallographic texture only means that the c-axis is in the plane of the film. See page 3, lines 1-6; and page 12, lines 9-13, of this specification.

(c) Bian does not mention "*oriented* in-plane media." Instead, it states that Bian's media have "in-plane crystallographic orientation," which persons of ordinary skill in this art would recognize as meaning that the C-axis of Bian's media is parallel to disc plane, and does not mean that the c-axis is parallel to the circumferential direction.

(d) G. Choe et al., "Effect of Crystallographic Orientation Dispersion on Media Thermal Stability and Recording Characteristics," IEEE TRANSACTION ON MAGNETICS, VOL. 38, No. 5, Page 1955, Sept. 2002, mention in-plane orientation also. The "Choe et al." reference is attached herewith. Choe et al. state in the first paragraph under INTRODUCTION that their glass media is *isotropic*, not oriented, and *yet* have an *in-plane orientation* of the Co c axis. In short, media with an in-plane orientation are *not necessarily* oriented media as has been incorrectly assumed by the Examiner. This fact is demonstrated by Choe et al. and well known to persons of ordinary skill in this art. The Choe et al. reference shows that persons of ordinary skill in this art use the phrase "in-plane crystallographic orientation" in contrast with out-of-plane orientation, but not to refer to "oriented in-plane media."

(3) The Examiner deems that one of ordinary skill in the art would have expected an Mrt OR greater than 1.05 given the texturing of the substrate/coating layer, *regardless of the subsequently deposited layers since the crystals of the underlayers must grow along the textured surfaces*. See page 10, last 3 lines of the Action. This conclusion is not correct.

Chen et al. US patent application Serial No. 09/619394, entitled " Anisotropic Magnetic Recording Medium," which is also being examined by the same Examiner as of the pending application, demonstrates that sample A of Table III, which was deposited on circumferential *textured* substrates, is ***not*** an oriented medium.

L. Huang et al. and M. Mirzamaani et al. (referred above) also state that texturing of the substrate is only one of the two requirements for making oriented media. Thus, even with a textured substrate, one might not produce an oriented medium if all the requirements for making oriented media are not satisfied.

In short, the determination of obviousness in this case is based on incorrect underlying factual inquiries and a faulty analysis applying incorrect facts. Therefore, the obviousness rejections should be withdrawn.

In the event that the transmittal letter is separated from this document and the Patent and Trademark Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952,** referencing docket number 146712002800. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: December 17, 2003 By: _____

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Enclosures:

(1) L. Huang et al., in "Effects of plasma etching on orientation ratio for longitudinal recording media", Journal of Applied Physics, Vol. 91, No. 10, Page 8628, 15 May 2002.

(2) M. Mirzamaani et al., J. Appl. Phys. **67**, 4695-4697, (1990).

(3) G. Choe et al., "Effect of Crystallographic Orientation Dispersion on Media Thermal Stability and Recording Characteristics," IEEE TRANSACTION ON MAGNETICS, VOL. 38, No. 5, Page 1955, Sept. 2002.

Substitute Pages 4 and 5 of the specification:

recording densities, and is attributed in part to inhomogeneous grain size and intergranular exchange coupling. Accordingly, in order to increase linear density, medium noise must be minimized by suitable microstructure control.

Recording performance is also determined by media properties known as PW50 and overwrite (OW). PW50 is the half width of the output signal, that is, the width of that portion of a pulse from the time its rising edge reaches one half of its amplitude to the time its falling edge falls to one half of its amplitude. A wide PW50 indicates that adjacent bits are crowded together resulting in interference, which limits the linear packing density of bits in a given track. Means of reducing PW50 include reducing Mrt (magnetic film thickness, t, times magnetic remanence, Mr), raising Hr, and increasing S*.

OW is a measure of what remains of a first signal after a second signal (for example of a different frequency) has been written over it on the media. Recording media with relatively poor OW characteristics maintains a good portion of the first signal after erasure. OW is improved by raising S* and by decreasing Hr and Mrt.

Li-Lien Lee et al. disclosed NiAl underlayers, which have small grain size, and promote (10. 0) crystallographic orientation of the magnetic media, ("NiAl underlayers for CoCrTa magnetic thin films", IEEE Transaction on Magnetics, Vol. 30, No. 6, pp. 3951-3953, November 1994, and US Patent No. 5,693,426). Seagate's U.S. Pat. No. 6,432,562, filed on September 10, 1999, issued August 13, 2002, and entitled "Magnetic Recording Medium with a NiAlRu seedlayer," discloses NiAlRu seedlayers, which also promote (10. 0) crystallographic orientation of the magnetic media. "Seedlayer Induced (002) Crystallographic Texture in NiAl Underlayers," L.-L. Lee, D. E. Laughlin and D. N. Lambeth, *J. Appl. Phys.*, 79 (8), pp. 4902-

4904 (1996), discloses a MgO seedlayer, which induces Cr(200) preferred orientation. "FeAl Underlayers for CoCrPt Thin Film Media," L.-L. Lee, D. E. Laughlin and D. N. Lambeth, *J. Appl. Phys.*, 81 (8), pp. 4366-4368 (1997), first reported an FeAl underlayer having a B2 structure.

U.S. Patent No. 6,174,582 discloses a seedlayer containing a refractory metal that promotes a (200) orientation in the Cr underlayer and a $(11\bar{2}0)$ orientation in the magnetic layer. The refractory metal can be selected from tantalum, niobium, vanadium, tungsten, molybdenum, or chromium. U.S. Patent No. 6,156,404 discloses an underlayer with a B2 crystal structure. This underlayer encourages a subsequent chromium layer to grow in a manner other than with a (200) orientation. In one case, the underlayer induces the chromium underlayer to grow with a preferred (110) orientation. The materials that can be used as an underlayer include a ruthenium-aluminum alloy. The materials that can be used for the chromium underlayer include chromium or a chromium alloy such as an alloy containing tantalum, vanadium, or molybdenum.

In order to store as much digital information as possible on a recording medium there is a continuing need for improved areal density magnetic recording media exhibiting high remanent coercivity and high SMNR. It is also desirable to produce recording media that has a minimum PW50. The need for lighter, smaller and better performing computers with greater storage density demands higher density

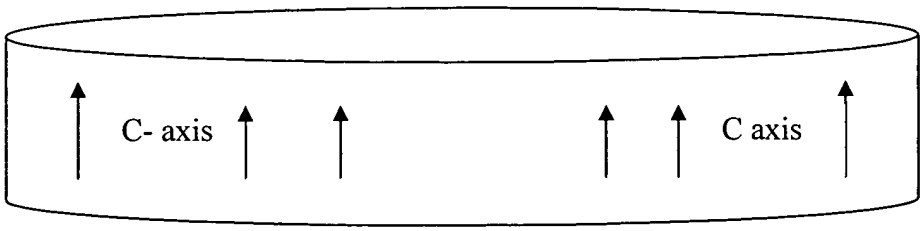

Fig. 1. Schematic drawing (side view) showing out-of-plane crystallographic orientation of HCP(hexagonal close-packed)-structured Co-alloy magnetic films.

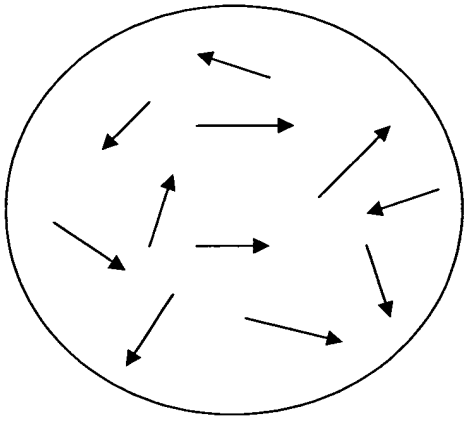

Fig. 2. Schematic drawing (top view) showing isotropic in-plane crystallographic orientation of HCP-structured Co-alloy magnetic films. The arrows stand for c axis direction, which is randomly distributed in the film plane.

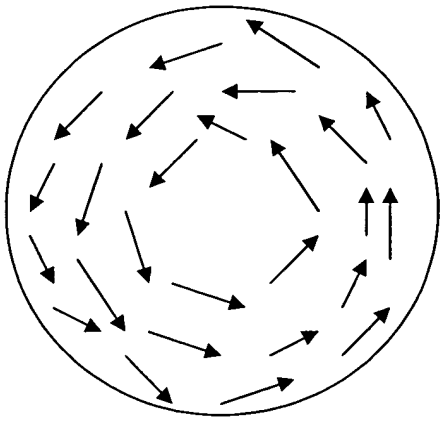

Fig. 3. Schematic drawing (top view) showing c axis direction (presented with the arrows) of HCP-structured Co-alloy magnetic films of oriented longitudinal recording medium according to one of hypotheses. The c axes are distributed more or less along circumferential texture lines for the oriented media.